

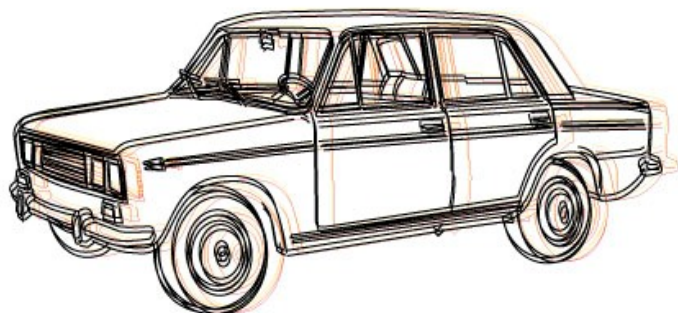
UNIDAD DIDÁCTICA DE ÁREAS NO LINGÜÍSTICAS

GRUPO/ GROUP	3º ESO	CURSO/YEAR	2009/2010
UNIDAD/UNIT 3	LAS SUSTANCIAS QUÍMICAS / CHEMICAL SUBSTANCES		
MATERIA/ SUBJECT	FÍSICA Y QUÍMICA / PHYSICS & CHEMISTRY		
PROFESORES/ TEACHERS	ISABEL CABRERIZO GÓMEZ		
OBJETIVOS LINGÜÍSTICOS / LINGUISTIC OBJECTIVES	<p>VOCABULARY: Molecules, chemical formula, bonds, compound, ionic bond, covalent bond, ion, anion, cation, balance of charges, energy, compounds, metal, non-metal, solid, liquid, gas, element, symbol, periodic table, group, period, mixture, combine, alloy, amalgam, distillation, chromatography, evaporation.</p> <p>KEY LANGUAGE:</p> <ul style="list-style-type: none"> - Making impersonal statements: Bonding is caused by a chemical reaction. - Defining: A covalent bond takes place between non- metals which share electrons. - Working different ways of expressing: reading, listening, writing and speaking. - Describing : The atoms in a compound are chemically joined together by strong forces called bonds. - Expressing cause and result. A compound is made when atoms of different elements join together by chemical bonds. 		
OBJETIVOS ESPECÍFICOS/ SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> - Conocer el criterio de clasificación de los elementos en el sistema periódico e identificar los grupos más importantes. - Distinguir elemento y compuesto químico. - Distinguir entre átomos, moléculas, compuestos y mezclas. - Conocer los símbolos de los elementos. - Saber diferentes formas de unirse los elementos, entre sí o con otros. - Conocer el tipo de sustancias que se pueden obtener con estas uniones. - Operar con masas moleculares y saber la composición porcentual de los elementos implicados en ellas. <p>Conocer las fórmulas de las sustancias más corrientes y agruparlas dentro de una determinada familia de compuestos.</p>		
CONTENIDOS / CONTENTS	<p>CONCEPTUALES</p> <ul style="list-style-type: none"> - Sistema periódico actual. - Los elementos químicos que forman la materia viva. - Elementos más representativos. - Metales y no metales. - Uniones entre átomos: moléculas y cristales. - Masas moleculares. - Algunos compuestos químicos corrientes. 	<p>PROCEDIMENTALES</p> <ul style="list-style-type: none"> - Identificar símbolos de diferentes elementos químicos. - Exposición de la forma en que se sitúan los elementos químicos en la Tabla Periódica. - Enumerar la importancia de los elementos y compuestos más importantes para la vida. - Escribir fórmulas para algunos compuestos y saber interpretarlas. - Cálculo de masas moleculares y composición centesimal. - Análisis de las uniones entre átomos. 	<p>ACTITUDINALES</p> <ul style="list-style-type: none"> - Valoración del conocimiento científico como instrumento imprescindible en la vida cotidiana.

ACTIVIDADES/ ACTIVITIES	<p>Pretareas. Comentar el vocabulario a tratar en la unidad. Comentar las ideas que tienen los alumnos sobre lo que es la materia, sus componentes, etc.</p> <p>Tareas. Lectura y comentario de los textos facilitados por parte del profesor. Revision de lo aprendido, realización de tests y realización de listenings en: www.bbc.co.uk/schools/ks3bitesize/science/chemical_material_behaviour/atoms_elements www.bbc.co.uk/schools/ks3bitesize/science/chemical_material_behaviour/compounds_mixtures Dibujar, usando el modelo símbolos de Dalton, elementos, átomos, moléculas, compuestos, mezclas. Consultando la página web: www.webelements.com se puede obtener mucha información acerca de los elementos de la tabla periódica y además esta página permite poder hacer un listening con información de los distintos elementos de la tabla. Realización de las actividades propuestas. Diferenciación de sustancias con enlace iónico, covalente o metálico según el tipo de elementos que las formen. Realización de la actividad denominada “Chemical elements’ dancing”, consistente en crear para cada alumno una especie de dorsal donde habremos colocado un símbolo químico(pueden estar repetidos algunos de ellos). Cada alumno será un átomo de los distintos elementos químicos. Usando un cassette, pondremos música(la pueden elegir los alumnos siempre y cuando invite a bailar). Los alumnos bailarán mientras que suena la música y al mismo tiempo buscarán a otros compañeros para que combinando los símbolos que representan los distintos átomos de los elementos se puedan formar moléculas. Cuando paremos la música, los alumnos que hayan conseguido unirse, se acercarán a la pizarra y uno de ellos anotará la molécula formada. Se revisará y se es correcta se anotará un punto cada alumno componente. Gana el alumno que mayor cantidad de puntos acumule. Lectura de alguna biografía de científicos que hayan contribuido al desarrollo de la Química, de textos que demuestren la importancia de la Química en nuestras vidas, de la gran cantidad de aplicaciones que tienen los distintos elementos químicos.</p> <p>Postareas. Realización de la autoevaluación que se adjunta.</p>
RECURSOS DIDÁCTICOS/ EDUCATION RESOURCES	<p>Internet (www.bbc.co.uk/schools/ks3bitesize/science), textos adaptados (Revise KS3 Science- Letts & Lonsdale), vídeos</p>
EVALUACIÓN/ ASSESSMENT	<p>Participación oral, fichas escritas individuales Los contenidos en inglés tendrán su importancia en la evaluación, ya que habrá que completar las preguntas que se hagan en esta lengua en el examen. La proporción de preguntas en esta lengua es de 2 en inglés por cada 8 en español.</p>
TEMAS TRANSVERSA LES/ CROSS- CURRICULAR TOPICS	<p>Educación para la salud . - Valorar la importancia de las sustancias para nuestra vida. - Hacer ver la gran cantidad de tóxicos que nos rodean en el hogar y hacer hincapié en las medidas preventivas que hay que tomar. - Explicar la gran cantidad de bebidas que tienen alcohol y hacerles ver el perjuicio del alcohol en la salud</p>
COMPETENCIAS BÁSICAS / BASIC COMPETENCES	<p>Competencia en comunicación lingüística. Trabajamos textos relacionados con el tema. Competencia en el conocimiento e interacción con el mundo físico. Estudiamos la materia desde el punto de vista microscópico analizando los átomos. Competencia matemática. Cálculo de masas moleculares y composición centesimal. Tratamiento de la información y la competencia digital. Uso de Internet. Competencia para aprender a aprender. Se trabajan habilidades para que el alumno sea capaz de seguir aprendiendo de forma autónoma. Autonomía e iniciativa personal. El conocimiento sobre las sustancias químicas contribuye a desarrollar en el alumno las destrezas necesarias para evaluar y emprender proyectos individuales y colectivos.</p>

Atoms and elements

Everything around us is made from different materials. A car, for example is made from lots of different materials.



The door handles are made from **plastic**. The windows are made from **glass**. The doors are made from **steel**. The tyres are made from **rubber**.

Different materials have different properties. The material you choose for a particular job depends on many factors including the properties you need, the cost and availability.

Elements

Materials are made from very small particles called **atoms**. Some materials are especial because they only contain one type of atom. These materials are called **elements**.

Water pipes are often made from copper. Copper is an element because it only contains copper atoms. The atoms have a regular arrangement so it's solid.

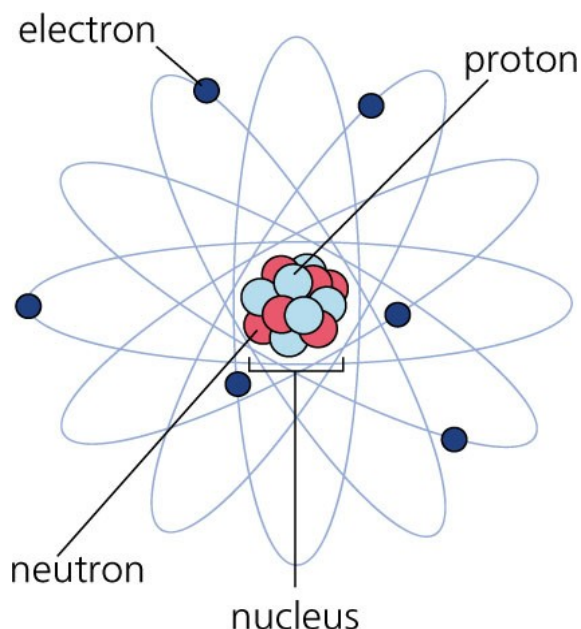
There are only about 100 different elements. They are displayed in the **periodic table**.

Saucepans are often made from steel. Steel isn't an element. It's a mixture of iron, carbon and chromium. Mixtures of metals are called **alloys**.

Inside atoms

Atoms are made up of three types of particles: **Protons, neutrons and electrons.**

Protons and neutrons are in the nucleus of the atom. The number of protons in an atom is called the **atomic number**.



The periodic table

<i>s-block</i> 1 New Designation IA Original Designation												<i>s-block</i> 18 VIIIA										
1	1 H 1.0094		2 IIA										2 He 4.00260									
<i>s-block</i>												Non-Metals										
												Atomic # Symbol Atomic Mass										
												<i>p-block</i>										
												13 14 15 16 17 IIIA IVA VA VIA VIIA										
												3 4 5 6 7 8 9 10 B C N O F Ne 10.81 12.011 14.007 15.999 18.998 20.179										
												13 14 15 16 17 18 Al Si P S Cl Ar 26.982 28.086 30.974 32.06 35.453 39.948										
												31 32 33 34 35 36 Ga Ge As Se Br Kr 69.72 72.59 74.922 78.96 79.904 83.80										
												49 50 51 52 53 54 In Sn Sb Te I Xe 114.82 118.71 121.75 127.60 126.91 131.29										
												81 82 83 84 85 86 Tl Pb Bi Po At Rn 204.38 207.2 208.98 (209) (210) (222)										
												(Mass Numbers in Parentheses are from the most stable of common isotopes.)										
												Phases Solid Liquid Gas										
<i>d-block</i>												<i>f-block</i>										
Rare Earth Elements																						
Lanthanide Series																						
Actinide Series																						

Russian scientist Dimitri Mendeleev designed the periodic table, which places the elements into a meaningful order. The elements are arranged in order of increasing atomic number. This means that elements with similar properties are in the same column or **group**. The table also splits the elements into **metals** and **non-metals**.

The **metal elements** are found on the left-hand side of the periodic table. More than three-quarters of the elements are metals and they include aluminium, iron and copper.

Metals have the following properties:

- They're shiny, especially when freshly cut
- They're hard and strong.
- They're dense.
- They're good conductors of heat and electricity.
- They have high melting point so they're solid at room temperature
- They can be drawn into wire and hammered into shape.
- A few metals are magnetic (iron, cobalt and nickel) but most are non-magnetic.

The **non-metal elements** are found on the right-hand side of the periodic table. Less than a quarter of the elements are non-metals and they include helium, oxygen and carbon, for example.

Non-metals have these characteristic properties:

- They have a low density.
- They're poor conductors of heat and electricity (except carbon in the form of graphite, which is a good electrical conductor).
- They have lower melting point so many are gases (nitrogen) at room temperature. A few are solid (sulphur). Only bromine is a liquid.

Symbols

Scientists use **symbols** to represent different elements. In some cases, the symbol is simply the first letter of the element's name.

In other cases, where several elements start with the same letter, the symbol is the first letter of the element's name followed by another letter from its name. When two letters are used...

- The first letter is a capital letter.
- The second letter is lower case.

Sometimes the symbol comes from the Latin name.

Examples: Carbon (C), Nitrogen (N), Oxygen (O), Calcium (Ca), Chlorine (Cl), Iron (Fe - Ferrum), Sodium (Na - Natrium).

Atomic mass

The atomic mass (m_a) is the mass of an atom, most often expressed in unified atomic mass units. The atomic mass may be considered to be the total mass of protons, neutrons and electrons in a single atom (when the atom is motionless).

Molecular mass

The **molecular mass** (abbreviated **m**) of a substance is the mass of one molecule of that substance, in unified atomic mass unit(s) u (equal to 1/12 the mass of one isotope of carbon-12).

Formulae

For a molecule we use the chemical symbols of the atoms it contains to write down its **formula**.

For example the formula for carbon monoxide is **CO**. It tells you that each molecule of carbon monoxide consists of one carbon atom joined to one oxygen atom.

Take care when writing your symbols and formulae. Be careful about when to use capital letters. For example **CO** means a molecule of carbon monoxide but **Co** is the symbol for cobalt.

The word 'formulae' ("form-u-lee") is the plural of 'formula'. If we have more than one formula, we don't say formulas, we say formulae.

What do numbers in formulae mean?

If the molecule contains more than one atom of an element we use numbers to show this. The numbers are written below the element symbol. For example, the formula for carbon dioxide is **CO₂**. It tells you that each molecule has one carbon atom and two oxygen atoms.

Take care when writing these formulae. The small number go at the bottom. For example CO₂ is correct but CO² is wrong.

Some formulae are more complicated. For example, the formula for sodium sulfate is **Na₂SO₄**. It tells you that sodium sulfate contains two sodium atoms (**Na₂**), one sulfur atom (**S**) and four oxygen atoms (**O₄**).



Formulae are always the same

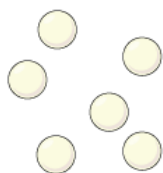
All compounds have a definite composition. Let's look at water as an example. A water molecule always has two hydrogen atoms and one oxygen atom - it cannot be a water molecule if it has different numbers of these atoms. Its formula is always **H₂O**

Atoms and molecules. Elements and compounds

Atoms of different elements can join together in chemical reactions to form compounds. For example **hydrogen** and **oxygen** are elements. They react together to form **water**, a compound.

There are countless different ways for the elements to join together, and millions of compounds are known.

Single atoms



Helium atoms

The atoms of some elements do not join up with other atoms. They stay as **single atoms**.

The element helium is like this. Helium is an unreactive gas. Helium atoms do not join up with each other or any other element. .

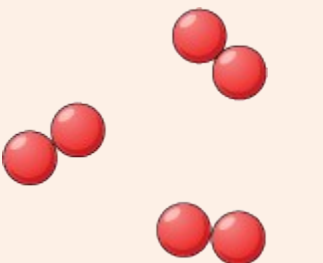
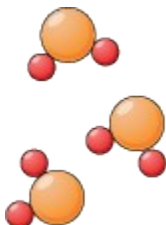
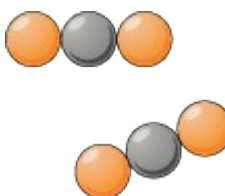
Atoms of different elements can join together in chemical reactions to form compounds. For example **hydrogen** and **oxygen** are elements. They react together to form **water**, a compound.

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Molecules of elements

When atoms of the **same** element join together we get a molecule of that element.

Molecules

<div>ELEMENT</div> <div>Oxygen</div>		<div>Water molecule</div> 
	<div>COMPOUNDS</div>	<div>Carbon dioxide molecule</div> 

Oxygen is like this. Two oxygen atoms join together to make an oxygen molecule. Most of the oxygen in the air is in this form. Hydrogen and chlorine also have molecules with two atoms. Some elements have molecules with more than two atoms. Sulfur atoms can make molecules of eight atoms joined together.

Compounds A compound is made when atoms of **different elements** join together by chemical bonds.

This means that compounds will always exist as molecules, not separate atoms. The diagrams show some molecules of common compounds.

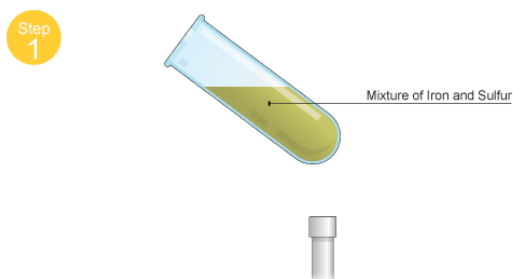
Compounds are chemicals made from atoms of different elements joined by chemical bonds. They can only be separated by a chemical reaction.

Properties of compounds

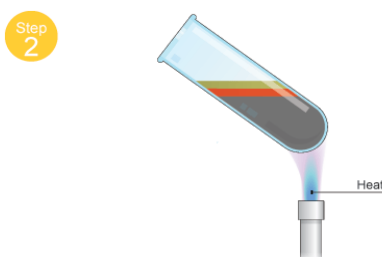
The properties of compounds are usually very different from the properties of the elements they contain. For example hydrogen and oxygen are both gases at room temperature, but water is a liquid.

The reaction between iron and sulfur to make **iron sulfide** is often used in school to study elements and compounds. Look at the animation to remind you what happens in this reaction.

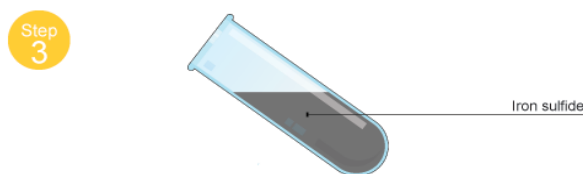
Creating iron sulfide



A test tube is filled with a mixture of iron and sulfur.



The test tube is heated using a bunsen burner.



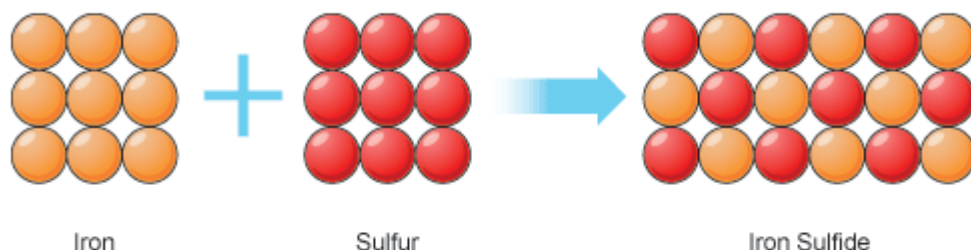
The mixture is now a compound called iron sulfide.

The table compares the properties of iron and sulfur (the two elements), and iron sulfide (the compound).

	Element	Element	Compound
	iron	sulfur	iron sulfide
colour	silvery grey	yellow	black
is it attracted to a magnet?	yes	no	no
reaction with hydrochloric acid	hydrogen formed	no reaction	smelly hydrogen sulfide formed

Chemical bonds

The atoms in a compound are chemically joined together by strong forces called **bonds**. You can only separate the elements in a compound using another chemical reaction. Separation methods like filtration and distillation will not do this.



Compounds form when atoms join together in a chemical reaction. Remember that an element is one type of atom, like carbon, gold or chlorine. We will look at three ways that atoms can exist.

Mixtures and compounds

A mixture is made from molecules of elements and compounds that are simply mixed together, without chemical bonds. Mixtures can be separated using techniques such as filtration, chromatography, evaporation and distillation.

A **mixture** is made from different substances that are **not chemically joined**. For example powdered iron and powdered sulfur mixed together makes a mixture of iron and sulfur. They can be separated from each other without a chemical reaction,

in the way that different coloured sweets can be picked out from a mixed packet and put into separate piles.



Mixtures have different properties from compounds. The table summarises these differences.

Mixture

Compound

Composition	Variable composition – you can vary the amount of each substance in a mixture.	Definite composition – you cannot vary the amount of each element in a compound.
Joined or not	The different substances are not chemically joined together.	The different elements are chemically joined together.
Properties	Each substance in the mixture keeps its own properties.	The compound has properties different from the elements it contains.
Separation	Each substance is easily separated from the mixture.	It can only be separated into its elements using chemical reactions.
Examples	Air, sea water, most rocks.	Water, carbon dioxide, magnesium oxide, sodium chloride.

An example - iron, sulfur and iron sulfide.

Remember that iron and sulfur react together when they are heated to make a compound called iron sulfide. What are the differences between a mixture of iron and sulfur, and iron sulfide? Here are some of them:

The mixture can contain more or less iron, but iron sulfide always contains equal amounts of iron and sulfur.

The iron and sulfur atoms are not joined together in the mixture, but they are joined together in iron sulfide.

The iron and sulfur still behave like iron and sulfur in the mixture, but iron sulfide has different properties from both iron and sulfur.

You can separate the iron from the mixture using a magnet but this does not work for iron sulfide.

Can you recognise elements, compounds and mixtures?

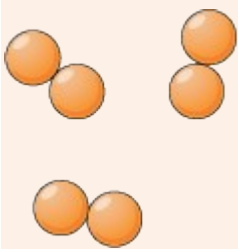
An element contains just one type of atom.

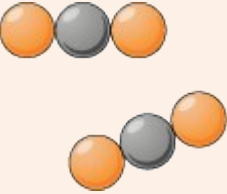
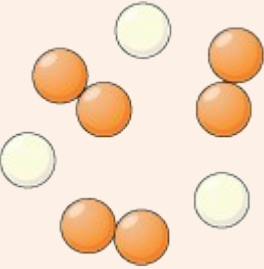
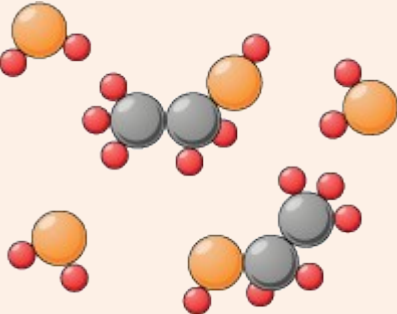
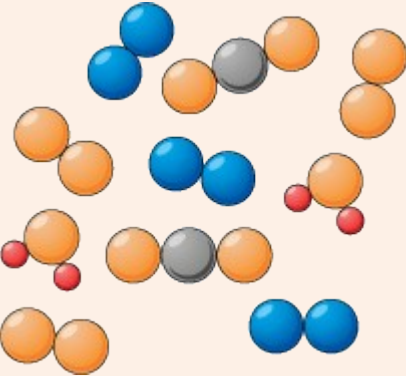
A compound contains two or more types of atom joined together.

A mixture contains two or more different substances that are not joined together.

The different substances in a mixture can be elements or compounds.

The table shows some examples.

Description	Example	Diagram
Pure element	oxygen	

Description	Example	Diagram
Pure compound	carbon dioxide	
Mixture of elements	oxygen and helium	
Mixture of compounds	alcohol and water	
Mixture of elements and compounds	air	

Notice that the different substances in a mixture can be single atoms, molecules of elements or molecules of compounds.

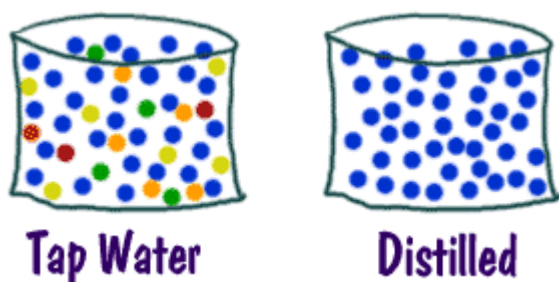
The different substances in mixtures are usually easily separated from one another. The method you use depends upon the type of mixture you have.

Mixture Basics

Mixtures are absolutely everywhere you look. Mixtures are the form for most things in nature. Rocks, air or the ocean, they are just about anything you find.

They are substances held together by **physical forces**, not chemical. That statement means the individual molecules enjoy being near each other, but their fundamental chemical structure does not change when they enter the mixture.

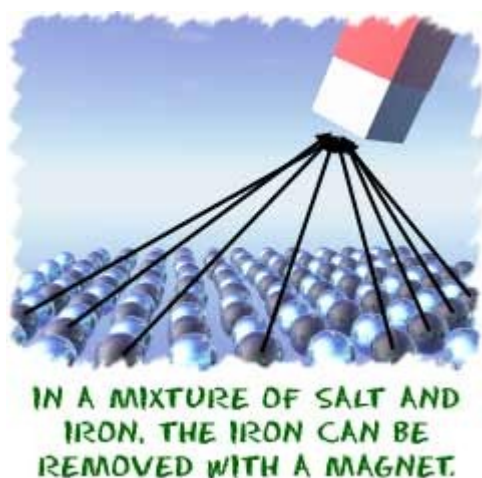
When you see **distilled water**, it's a pure substance. That fact means that there are just water molecules in the liquid. A mixture would be a glass of water with other things dissolved inside, maybe salt. Each of the substances in that glass of water keeps the original chemical properties. So, if you have some dissolved substances, you can boil off the water and still have those dissolved substances left over. Because it takes very high temperatures to boil salt, the salt is left in the container.



Mixtures are Everywhere

There are an infinite number of mixtures. Anything you can combine is a mixture. Think of everything you eat. Just think about how many cakes there are. Each of those cakes is made up of a different mixture of ingredients. Even the wood in your pencil is considered a chemical mixture. There is the basic cellulose of the wood, but there are also thousands of other compounds in that pencil.

Solutions are also mixtures. If you put sand into a glass of water, it is considered to be a mixture. You can always tell a mixture because each of the substances can be separated from the group in different physical ways. You can always get the sand out of the water by filtering the water away. A solution can also be made of two liquids. Even something as simple as bleach and water is a solution.



Alloys

There are a few more words you might hear when people talk about **mixtures**. We can't cover all of them, but we'll give you a quick overview of the biggies. **Alloys** are basically a mixture of two or more metals. Don't forget that there are many elements on the periodic table. Elements like calcium (Ca) and potassium (K) are considered metals. Of course, there are also metals like silver (Ag) and gold (Au). You can also have alloys that include small amounts of non-metallic elements like carbon (C). **Metals** are the key thing to remember for alloys.

The main idea with alloys is that they are better at something than any of the metals would be alone. Metallurgists (people who work with metals) sometimes add chromium (Cr) and/or nickel (Ni) to steel. While steel is already an alloy that is a very strong metal, the addition of small amounts of the other metals help steel resist rusting. Depending on what element is added, you could create Stainless Steel or Galvanized Steel. It's always about improving specific qualities of the original. Another good example of an alloy happens when metallurgists add carbon (C) to steel. A tiny amount of carbon (a non-metallic element) make steel stronger. These special carbon-steel alloys are used in armor plating and weapons.

Amalgams

Amalgams are a special type of alloy. We like them because we think mercury (Hg) is a cool element. You might know **mercury** as "quicksilver" or the metal that is liquid at room temperature. Anyway, amalgams are alloys that combine mercury and other metals in the periodic table. The most obvious place you may have seen amalgams is in old dental work. The fillings in the mouths of your grandparents may have been amalgams. We already talked about mercury's being a liquid at room temperature. That physical trait was used when they made fillings. Let's say you have an amalgam of mercury (Hg) and silver (Ag). When it is created, it is very soft. As time passes, the mercury leaves the amalgam and the silver remains. The silver that is left is very hard. Voila! You have a filling!

NOTE: Never, ever, play with mercury (Hg)! It is very poisonous. You shouldn't even touch it because it will seep into your skin. Dentists don't usually use amalgams with mercury anymore because it may have slowly poisoned people and gotten them sick.



SOME FILLINGS IN YOUR
TEETH ARE MADE
OF AMALGAMS.

Methods for separating substances

Chromatography

This is good for separating dissolved substances that have different colours, such as inks and plant dyes. It works because some of the coloured substances dissolve in the liquid better than others, so they travel further up the paper.

Filtration

Filtration is good for separating an **insoluble solid** from a liquid. (An insoluble substance is one that does not dissolve).

Sand, for example, can be separated from a mixture of sand and water using filtration. That's because sand does not dissolve in water

Evaporation

This is good for separating a **soluble solid** from a liquid (a soluble substance does dissolve, to form a solution).

For example copper sulfate crystals can be separated from copper sulfate solution using evaporation. Remember that it is the water that evaporates away, not the solution

Simple distillation

This is good for separating a **liquid** from a solution. For example, water can be separated from salty water by simple distillation. This method works because the water evaporates from the solution, but is then cooled and condensed into a separate container. The salt does not evaporate and so it stays behind

Fractional distillation

This is good for separating **two or more liquids** from each other. For example, ethanol (alcohol) can be separated from a mixture of ethanol and water by fractional distillation. This method works because the two liquids have different boiling points.

DIFFERENT ACTIVITIES TO MAKE

1. Match each key word with its meaning.

Alloy	A material that's made of only one type of atom.
Atom	A very small particle.
Formula	A mixture of metals.
Compound number	A way of displaying elements in order of increasing atomic number
Element	A one or two- letter code used to represent an element.
Molecule	Contain atoms of two or more different elements that have been joined together by a chemical reaction
Periodic table	The number of protons in an atom.
Symbol	A small group of atoms that are joined together.
Atomic number	A code to represent the type and number of atoms present

2. Look into Dimitri Mendeleev answering these questions:

Where was Dimitri Mendeleev born?

In which city did Mendeleev become famous?

How did Mendeleev become famous?

How many elements were known when Mendeleev designed his table?

Why did he leave gaps in the table?

Why didn't Mendeleev include any noble gases in his table?

Which element was named after Mendeleev?

3. Fill in the missing words to complete the sentences about atoms and elements.

A) Everything round us is made of small particles called

Some materials are made of only one type of atom and these materials are called

B) There are about 100 different elements and they're arranged in the Table. The elements can be split into metals and non- metals. The metals are found on the ----- hand side of the periodic table.

C) Metals are hard and, especially when they're freshly cut . Only one metal isn't solid at room temperature. This metal is called is used in thermometers.

D) Non- metals are poor conductors of both heat and Oxygen is a non- metal element.

E), like copper, are made of only one type of atom. Compounds are made when..... two or more different elements are joined together by a chemical reaction

F) A is formed when two or more substances are mixed together. Mineral water and rocks are examples of everyday

4. Find out the molecular mass for the following molecules: NaOH, PbO₂, Ca(OH)₂.

TEST YOUR KNOWLEDGE

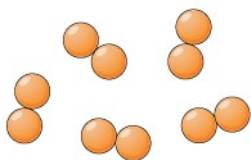
1. How many different atoms are there in a compound?

one

always two

two or more

2. Does this show an element, a mixture or a compound?



compound

mixture

element

3. Which statement about atoms and molecules is correct?

elements always exist as separate atoms.

elements always exist as pairs of atoms called molecules.

elements and compounds can exist as molecules.

4. Is water an element, compound or mixture?

element

compound

mixture

5. Which is the best way to get salt from salty water?

evaporation

filtration

distillation

6. Pure water can be separated from inky water by simple distillation. This is because:

water and ink have different boiling points.
water evaporates leaving the ink particles behind.
ink evaporates leaving the water behind.

7. What is the correct order for obtaining salt from a mixture of sand and salt?

dissolving in water - filtration - evaporation
evaporation - filtration - dissolving in water
filtration - dissolving in water - evaporation

8. Which method is usually used to separate coloured substances from each other?

simple distillation
evaporation
chromatography

9. Which of these three metals is the most reactive: potassium, iron or gold?

potassium
iron
gold

10. Which of these three metals is the least reactive: iron, copper or platinum?

iron
copper
platinum

11. Copper and oxygen react to form which compound?

copper oxygen
copper oxide
carbon dioxide

SELF- ASSESSMENT

CHOOSE THE CORRECT OPTION FOR THE FOLLOWING QUESTIONS

1. Which of these choices is not a major part of an atom?

- [Electrons](#)
- [Protons](#)
- [Neutrons](#)
- [All are parts of an atom.](#)

2. An isotope is a form of an atom with a different number of...

- ▶ [Electrons](#)
- ▶ [Protons](#)
- ▶ [Neutrons](#)
- ▶ [All of the Above](#)

3. The atomic number of an element tells you the number of _____.

- ▶ [Electrons or Neutrons](#)
- ▶ [Electrons or Protons](#)
- ▶ [Protons or Neutrons](#)

4. An ion is a form of an atom with a different number of...

- ▶ [Electrons](#)
- ▶ [Protons](#)
- ▶ [Neutrons](#)
- ▶ [All of the Above](#)

5. Which of these particles is found in the atomic nucleus?

- ▶ [Electrons and Protons](#)
- ▶ [Neutrons and Electrons](#)
- ▶ [Protons and Neutrons](#)

6. Which scientist is NOT associated with the study of atomic structure?

- ▶ [Niels Bohr](#)
- ▶ [Ernest Rutherford](#)
- ▶ [Friedrich Hund](#)
- ▶ [All of these scientists worked with atomic structure.](#)

7. Scientists use spectroscopy to identify elements.

- ▶ [True](#)
- ▶ [False](#)

8. Atoms in the same family of elements on the periodic table share similar characteristics.

▶ [True](#)

▶ [False](#)

9. What is the first element on the periodic table?

▶ [Helium \(He\)](#)

▶ [Hydrogen \(H\)](#)

▶ [Lithium \(Li\)](#)

▶ [Argon \(Ar\)](#)

10. Oxygen (O) has a greater mass than chlorine (Cl).

▶ [True](#)

▶ [False](#)

11. Which of these is an inert gas?

▶ [Chlorine \(Cl\)](#)

▶ [Hydrogen \(H\)](#)

▶ [Neon \(Ne\)](#)

▶ [Fluorine \(F\)](#)

12. Silicon (Si) and carbon (C) share some similar characteristics.

▶ [True](#)

▶ [False](#)

13. Which of these is NOT found in the Earth's atmosphere?

▶ [Nitrogen \(N\)](#)

▶ [Oxygen \(O\)](#)

▶ [Gold \(Au\)](#)

▶ [Argon \(Ar\)](#)

14. All of the following are in the same rows/periods of the periodic table EXCEPT...

▶ [Beryllium\(Be\), Oxygen\(O\), Fluorine\(F\)](#)

▶ [Hydrogen\(H\), Helium\(He\)](#)

▶ [Sodium\(Na\), Carbon\(C\), Chlorine\(Cl\)](#)

▶ [Lithium\(Li\), Boron\(B\), Neon\(Ne\)](#)

15. Sodium (Na) tries to fill up its third shell when it bonds.

▶ [True](#)

▶ [False](#)

16. You might find boron (B) in the soap in the bathtub.

▶ [True](#)

▶ [False](#)

17. Oxygen (O) usually tries to make two bonds with other atoms to fill its outer shells.

▶ [True](#)

▶ [False](#)

18. About how many known elements are there?

▶ [10](#)

▶ [50](#)

▶ [100](#)

▶ [200](#)

19. Elements in the periodic table are arranged by...

▶ [Atomic Number](#)

▶ [Atomic Weight](#)

▶ [Number of Neutrons](#)

▶ [Chemical Reactivity](#)

20. Which of these things will you NOT find in the periodic table on the wall?

▶ [Element Name and Symbol](#)

▶ [Atomic Weight](#)

▶ [Atomic Orbital Radius](#)

▶ [Atomic Number](#)

21. Which scientist came up with the concept of a periodic table that included all of the known elements?

▶ [Jason Priestly](#)

▶ [Dmitri Mendeleev](#)

▶ [Antoine Lavoisier](#)

▶ [Albert Einstein](#)

22. Rows in the periodic table are called periods.

▶ [True](#)

▶ [False](#)

23. Which of these choices is NOT a family of elements?

- ▶ [Halogen](#)
- ▶ [Metal](#)
- ▶ [Inert Gas](#)
- ▶ [All are groups of elements.](#)

24. The atomic number of an element tells you the number of _____ in a neutral atom.

- ▶ [Positrons](#)
- ▶ [Neutrons](#)
- ▶ [Electrons](#)
- ▶ [None of the Above](#)

25. The columns of the periodic table are called groups.

- ▶ [True](#)
- ▶ [False](#)

26. You will find metals on the right side of the periodic table.

- ▶ [True](#)
- ▶ [False](#)

27. Although the order of elements is based on atomic number, vertical families share similar chemical properties.

- ▶ [True](#)
- ▶ [False](#)

28. Which of these is NOT one of the basic pieces of an atom?

- ▶ [Electron](#)
- ▶ [Quatron](#)
- ▶ [Proton](#)
- ▶ [Neutron](#)

29. Which atomic particle has a negative charge?

- ▶ [Electron](#)
- ▶ [Proton](#)
- ▶ [Neutron](#)
- ▶ [None of the Above](#)

30. An electron has a mass that is much less than a proton.

▶ [True](#)

▶ [False](#)

31. An atom with a neutral charge has the same number of...

▶ [Protons and Neutrons](#)

▶ [Neutrons and Electrons](#)

▶ [Protons and Electrons](#)

32. There is no particle of matter smaller than an atom.

▶ [True](#)

▶ [False](#)

33. Atoms of an element may have more or less neutrons or electrons than other atoms of the same element.

▶ [True](#)

▶ [False](#)

34. The innermost atomic shell can hold a maximum of 18 electrons.

▶ [True](#)

▶ [False](#)

35. When atoms bond with each other, they exchange...

▶ [Protons](#)

▶ [Neutrons](#)

▶ [Electrons](#)

36. Where are halogens found on the periodic table?

▶ [Left Side](#)

▶ [Right Side](#)

▶ [Top](#)

▶ [Bottom](#)

37. Halogens are very...

▶ [Reactive](#)

▶ [Stable](#)

▶ [Heavy](#)

▶ [Radioactive](#)

38. You find halogens in _____.

- ▶ [In Amalgams with Metals](#)
- ▶ [Not Bonded to Other Elements](#)
- ▶ [In Salt Compounds with Metals](#)
- ▶ [None of the Above](#)

39. If you add an electron to a halogen, you will have the same number of electrons as a noble gas.

- ▶ [True](#)
- ▶ [False](#)

40. Which of these terms is NOT associated with halogens?

- ▶ [Reactive](#)
- ▶ [Diatomic](#)
- ▶ [Nonmetallic](#)
- ▶ [All are associated with halogens.](#)

41. The lightest halogen is...

- ▶ [Chlorine](#)
- ▶ [Iodine](#)
- ▶ [Fluorine](#)
- ▶ [Bromine](#)

42. An ion of a halogen will often have a charge of...

- ▶ [-1](#)
- ▶ [+1](#)
- ▶ [-2](#)
- ▶ [+2](#)

43. A halogen would quickly form a bond with a noble gas.

- ▶ [True](#)
- ▶ [False](#)

44. Some of the most powerful acids are found with halogen atoms.

- ▶ [True](#)
- ▶ [False](#)

45. How many electrons would you expect a neutral halogen atom to have in its outer orbital?

- ▶ [5](#)
- ▶ [6](#)
- ▶ [7](#)
- ▶ [8](#)

46. Mixtures are always combinations of the same compounds that are at different states.

- ▶ [True](#)
- ▶ [False](#)

47. You can separate all mixtures by filtration.

- ▶ [True](#)
- ▶ [False](#)

48. Would it be possible to have a mixture made of all carbon atoms and compounds with only carbon atoms?

- ▶ [Yes](#)
- ▶ [No](#)

49. All mixtures are defined as "heterogeneous."

- ▶ [True](#)
- ▶ [False](#)

50. Mixtures are generally separated by what methods?

- ▶ [Chemical](#)
- ▶ [Physical](#)

51. Only specific compounds can be combined to form mixtures.

- ▶ [True](#)
- ▶ [False](#)

52. All solutions are mixtures, but not all mixtures are solutions.

- ▶ [True](#)
- ▶ [False](#)

53. As the temperature of a mixture increases, one part of the mixture may melt while the other parts remain solid.

▶ [True](#)

▶ [False](#)

54. Which of these is not a mixture?

▶ [Solution](#)

▶ [Alloy](#)

▶ [Amalgam](#)

▶ [They are all mixtures](#)

55. Which of these is not a mixture?

▶ [Oil and Water](#)

▶ [Sand and Water](#)

▶ [Diet Soda](#)

▶ [All are mixtures.](#)